

REMARKS

Upon entry of this Amendment, claims 1-7 and 9-15 are all the claims pending in the application. Claims 14 and 15 have been added. Applicant thanks the examiner for acknowledging that claim 6 contains patentable subject matter. Claims 1-5 and 9-13 presently stand rejected. For the reasons set forth below, Applicant respectfully traverses the rejections.

Drawings

The proposed drawing correction filed December 30, 2002 has been approved by the Examiner; however, the Examiner has again objected to the drawings filed January 24, 2002 for allegedly failing to show “the metal layer formed on both side of the flexible wiring circuit board (claim 13) in Fig. 1”, and “...a metal layer disposed on the suspension board in claims 10” as described in the specification.

First, with respect to claim 13, Applicant points out that Fig. 9 clearly shows that the metal layer 27 is formed on both sides of the junction flexible wiring circuit board 4. See also, last paragraph of page 27 of specification.

Second, with respect to claim 10, Applicant points out that Fig. 1 clearly shows a metal layer 5 disposed on the suspension board 2. See also, last paragraph of page 10 of specification.

Withdrawal of the drawing objections is, thus, in order.

§ 112 Rejections

Claims 10 and 13 are rejected under 35 U.S.C. § 112, second paragraph.

With respect to claim 10, Applicant submits that the characteristic impedance of the junction flexible wiring circuit board recited in claim 9 provides for a range, i.e. from -10% to

+10% of the characteristic impedance of the suspension board. Such a range would include a difference of zero. Claim 10 further narrows this range to be substantially equal, i.e., substantially zero difference. Thus, this recitation in claim 10 is proper and definite.

Still further, the recitation that the metal layer 27 is disposed “in a same manner as a metal layer” 5 disposed on the suspension is also definite. As discussed on page 19, last paragraph, because the metal layer 27 is provided on the circuit board 21 in the same manner as the metal substrate 5 is provided on the suspension board, the characteristic impedance of the circuit board 21 can be set nearer to or substantially equal to the suspension board 2. As to being disposed “in the same manner”, it is noted that page 10 of the specification explains that the metal layer is formed as a metal substrate made of stainless steel foil or the like, and page 18 of the specification explains that the metal layer 27 may be formed of a sheet of stainless steel foil or the like. In view of the foregoing, claim 10 is definite.

With respect to claim 13, the Examiner questions “how one metal layer [can be] formed on both [sides] of the flexible circuit board”. However, the claims never limit the metal layer to “one”. While claim 7 recites that a metal layer is formed on *at least* one side, claim 13 recites that a metal layer is formed on both sides. In view of the foregoing, claim 13 is definite.

Withdrawal of the §112 rejection is, thus, believed to be in order.

Prior Art Rejections

The previous prior art rejections have been withdrawn in view of the following new rejections. Claims 1-5, 7, 9, 10 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the admitted Prior Art (Figure 12, submitted by applicant) in view of newly

cited Kuramochi et al. (6,252,176). Claims 11 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the admitted Prior Art (Fig. 12) in view of newly cited Kuramochi et al. (USP 6,252,176) and further in view of newly cited Kishimoto et al. (USP 6,524,892). For the following reasons, Applicant respectfully traverses the prior art rejections.

Arguments

Of the rejected claims, only claims 1 and 9 are in independent form; therefore, the following discussion is initially directed to these independent claims.

Regarding the conventional art, problems arise in that the characteristic impedance between the magnetic head, suspension board, junction flexible wiring circuit board and control circuit board do not match. When the characteristic impedance of the flexible wiring circuit board is higher than that of the suspension board, signal reflection occurs in a junction portion between the boards, and causes deterioration of transmission.

The inventors of the present invention discovered that adding a metal layer in the recited configuration served to reduce these transmission problems by bringing the characteristic impedance of the boards closer together.

The Examiner turns to Kuramochi for disclosing a metal layer on a circuit board, and asserts that it would have been obvious to have provided the metal layer on the circuit board of the admitted prior art “to provide a different of characteristic impedance of electrical connections between the flexible circuit board, the suspension board and the control board.” Although the Examiner expressly provides a motivation to provide a “different” characteristic impedance, for purposes of this response, Applicant assumes that this is a typographical error and the Examiner

meant to imply that the motivation was to “reduce the difference.” If Applicant is incorrect, clarification is requested on the record.

Kuramochi discloses a printed wiring board, and in particular, teaches the use of two conductive layers 2 and 3 which must be arranged so as to be electrically conducted with each other (col. 3, lines 21-22) via terminal 4. The thickness of the insulating layer 1 is varied to change the electric characteristics of the printed wiring board according to the circuit configuration of the conductive layers 2 and 3 or auxiliary insulating layers 8, 9 (col. 3, lines 5-9; col. 5, lines 20-35).

Applicant submits that it would not have been obvious to modify the admitted prior art with Kuramochi to arrive at the present invention for the following reasons.

First, Kuramochi does not provide the requisite motivation for applying a metal layer to the board of the admitted prior art. The Examiner cites the motivation as being the desire to reduce the difference in the characteristic impedance between the flexible circuit board and the suspension board and control board. However, Kuramochi never teaches or suggests that the metal layers 2, 3 would achieve this objective. Kuramochi is directed to controlling the characteristics of a digital and analog signal on one printed wiring board, by manipulating the insulation between the metal layers 2 and 3.

Thus, there is no reason why one of ordinary skill in the art would have thought to provide a metal layer on the admitted prior art merely based on the teachings of Kuramochi.

Second, even if one were motivated to add a metal layer to the admitted prior art, one would not have thought to add the metal layer in the arrangement of the present invention. In the

present invention, the metal layer is provided “in the lengthwise direction except portions where terminal portions are provided”. This is in direct contrast to the teachings of Kuramochi.

Kuramochi discloses that the metal layers are in contact with the terminals 4, as this is the only way the metal layers 2, 3 could be electrically conducted to each other (which is required). Still further, Kuramochi specifically teaches that the terminals (4, 28) are through-holes. Thus, the metal layers are provided continuously along the lengthwise direction and do not present an exception at the terminal portions (4, 28).

In view of the foregoing, the combination of cited references fails to arrive at claim 1.

Turning to independent claim 9, the combination of references fails to teach or suggest the capability of achieving a characteristic impedance of the junction flexible wiring circuit board to be within $\pm 10\%$ of that of characteristic impedance of the suspension board and the control circuit board.

As mentioned above, the combination of cited references fails to teach or suggest the novel structure of the present invention. Since there is no teaching or suggestion for providing a metal layer in the arrangement of the present invention, the combination of references would not have resulted in a design which would be capable of achieving the closeness in characteristic impedance of the boards in the present invention.

Thus, claim 9 is patentable.

The remaining rejections are directed to the dependent claims. These claims are patentable for at least the same reasons as claims 1 and 9, by virtue of their dependency therefrom.

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 10/053,555

Patentability of New Claims

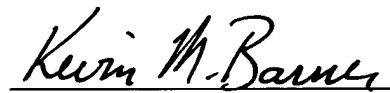
For additional claim coverage merited by the scope of the invention, Applicant has added new claims 14 and 15. Applicant submits that the prior art does not disclose, teach, or otherwise suggest the combination of features contained therein. For example, none of the prior art references teach or otherwise suggest that the metal layer does not extend in the portions having the terminal. Support for the subject matter recited in new claims 14 and 15 is found at least in the figures.

Conclusion

In view of the foregoing remarks, the application is believed to be in form for immediate allowance with claims **1-7 and 9-15**, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to **contact the undersigned** at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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